

Armed Forces College of Medicine

AFCM



Trigeminal nerve

By Professor Dr Shahira Youssef

INTENDED LEARNING OBJECTIVES (ILO)

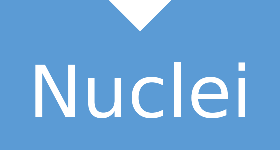


By the end of this lecture the student will be able to:

1. Identify the nuclei of the trigeminal nerve and their function
2. List the two roots of the nerve
3. Describe the course & branches of maxillary and mandibular nerve
4. Correlate the distribution of nerves with clinical picture following injury

Key features





Nuclei

- Motor nucleus
- 3 Sensory: main sensory, spinal and mesencephalic

Roots

- Sensory root
- Motor root

Branches

- Ophthalmic
- Maxillary
- Mandibular

Trigeminal nuclei



- **Motor nucleus**: in pons gives rise

 to motor root of trigeminal passes below g

- **Main sensory nucleus**:

In pons for touch and pressu

- **Spinal nucleus**:

it extends to spinal cord concerned with pain and temperature

- **Mesencephalic nucleus**: extends to m carries proprioception

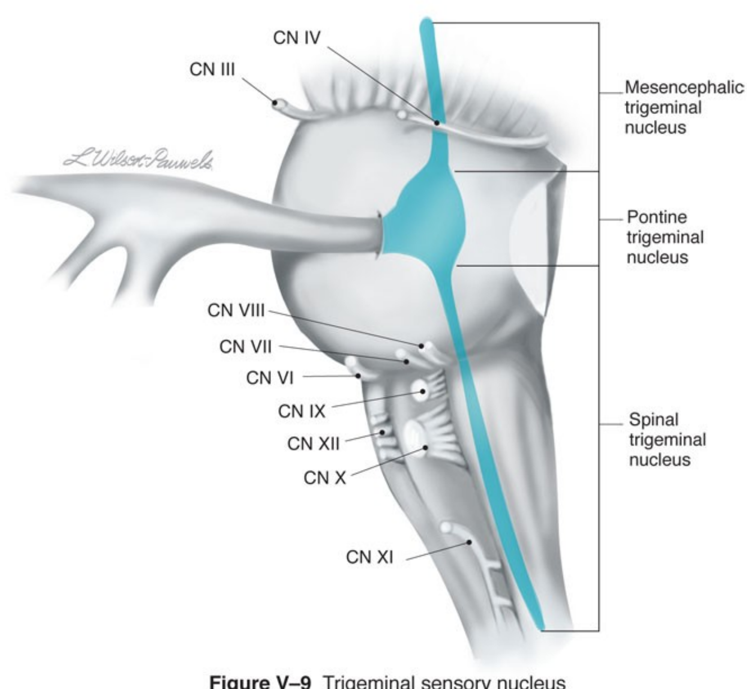


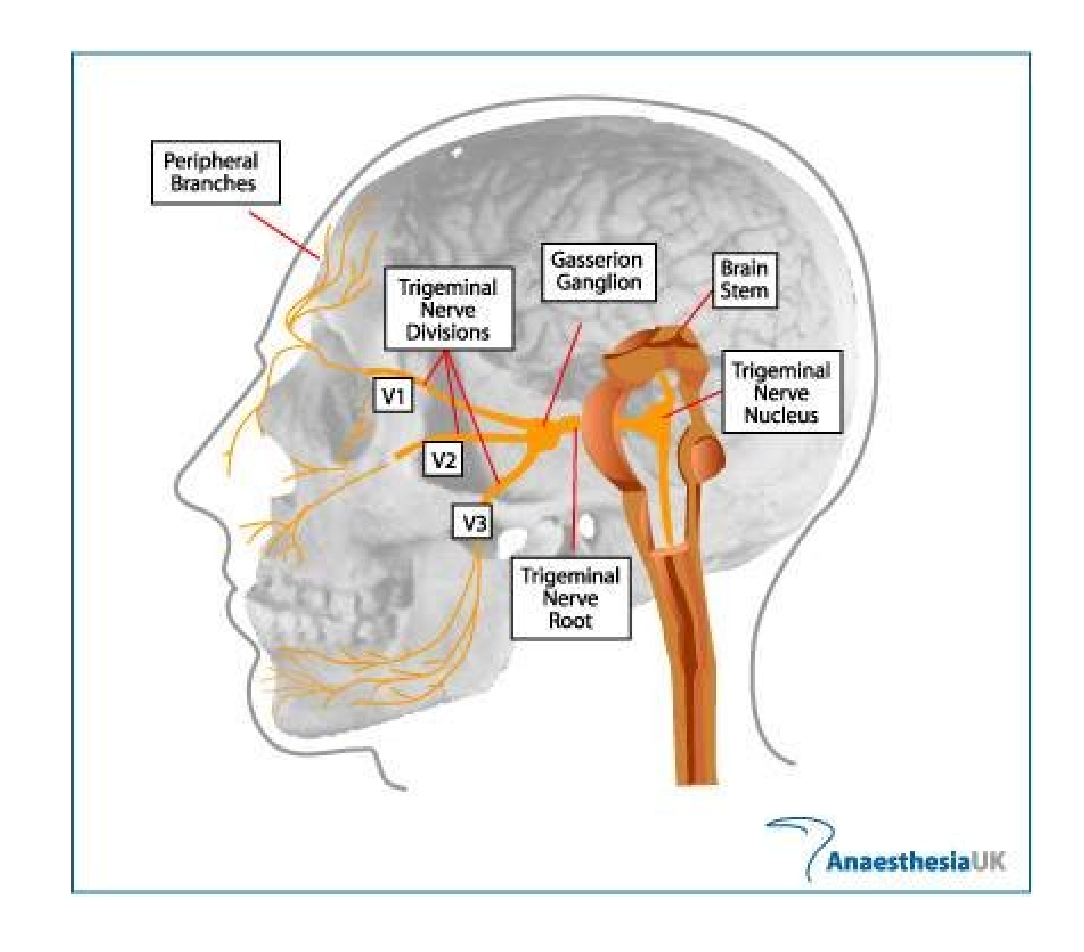
Figure V–9 Trigeminal sensory nucleus (lateral view of the brain stem).

From Cranial Nerves 3rd Ed. ©2010 Wilson-Pauwels, Stewart, Akesson, Spacey, PMPH-USA

Trigeminal ganglia



- Sensory ganglia
- Lies at apex of petrous part of temporal bone
- Covered by a fold of dura called cavum trigeminale
- Crescentic in shape
- Cells are pseudounipolar, have peripheral processes & central procceses
- Central process form **sensory root**
- Peripheral processes from the 3 divisions of trigeminal



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Trigeminal ganglia



TRIGEMINAL NERVE (CN V)

1. https://www.google.com/imgres?imgurl=http%3A%2F%2Fwww.meddean.luc.edu%2Flumen%2FMedEd%2FGrossAnatomy%2Fh_n%2Fcn%2Fcn1%2Fimages%2Fcn-5.jpg&imgrefurl=http%3A%2F%2Fwww.meddean.luc.edu%2Flumen%2FMedEd%2FGrossAnatomy%2Fh_n%2Fcn%2Fcn1%2Fcn5.htm&docid=G8mEwWdfShWzQM&tbnid=Pi5a-G_ZMS47IM%3A&vet=10ahUKEwjLq8u3nYrkAhVI1xoKHeOwCakQMwiHASgOMA4..i&w=325&h=362&bih=689&biw=1280&q=trigeminal%20ganglion&ved=0ahUKEwjLq8u3nYrkAhVI1xoKHeOwCakQMwiHASgOMA4&iact=mrc&uact=8

Trigeminal nerve



- Which nucleus receives sense of pain from the face

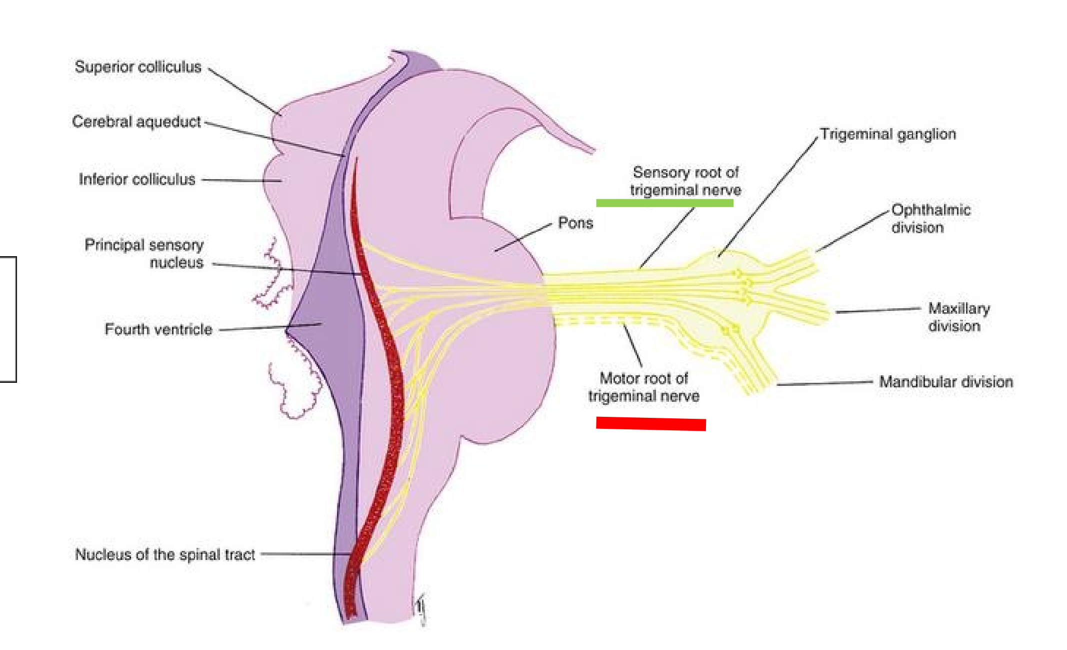
a. Main sensory
b. Spinal
c. Mesencephalic
d. Clarks
e. Substania gelatinosa

Roots of trigeminal nerve



Motor root:
arise from motor nucleus passes beneath trigeminal ganglia to be distributed with mandibular nerve

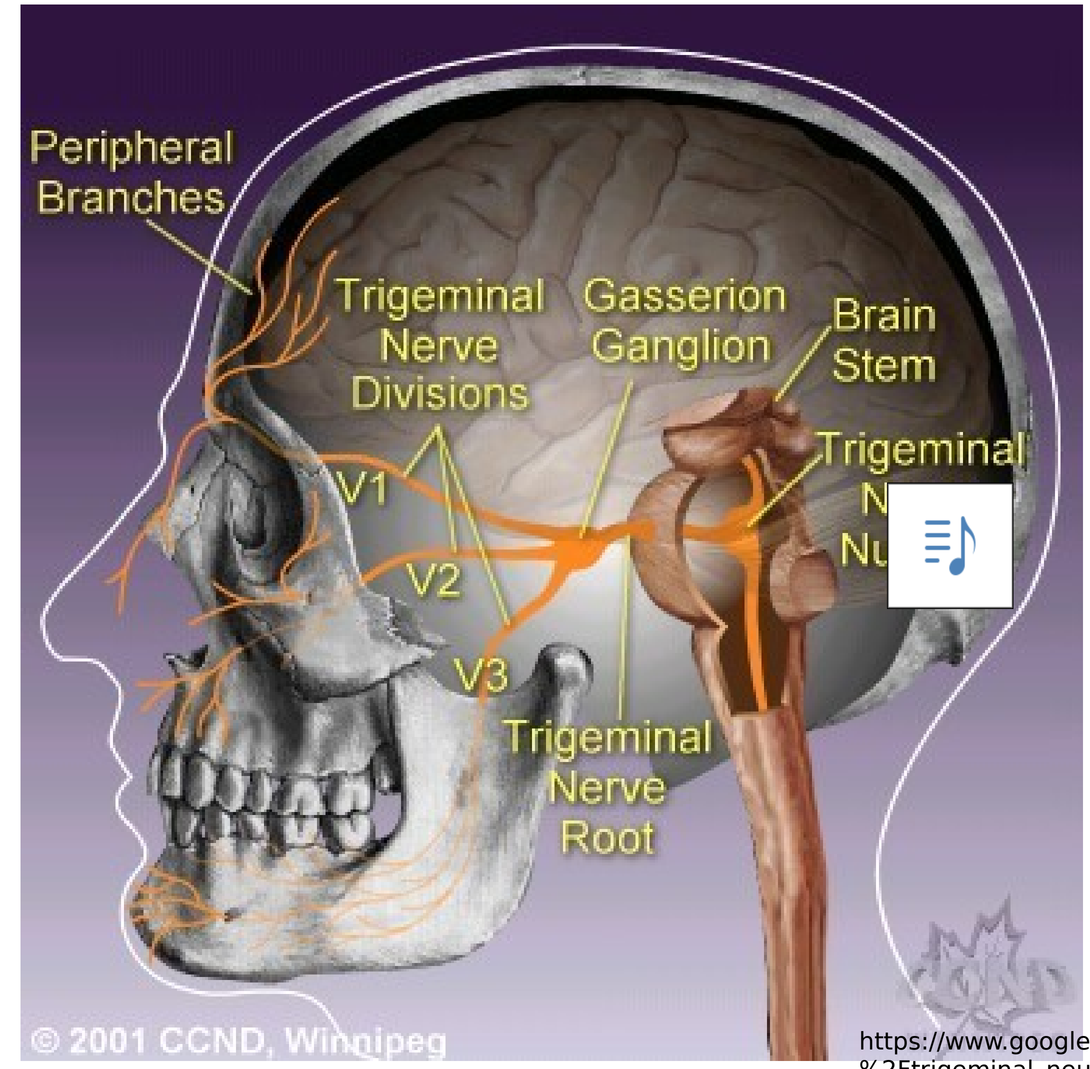
Sensory root:
arise from central processes of cells trigeminal ganglia. it is attached to pons



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Roots of trigeminal nerve





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Trigeminal nerve



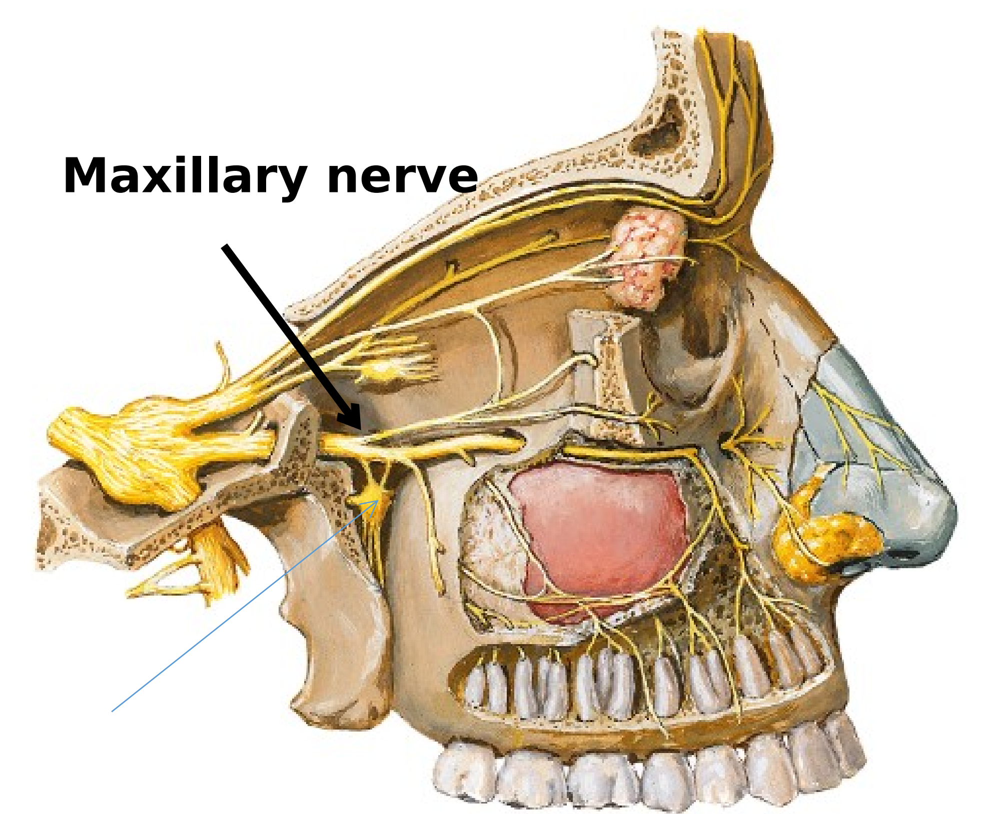
Peripheral process of cells of trigeminal ganglia forms which of the following

a. Sensory root
b. Motor root
c. Branches of trigeminal
d. Nuclei of trigeminal

Maxillary nerve



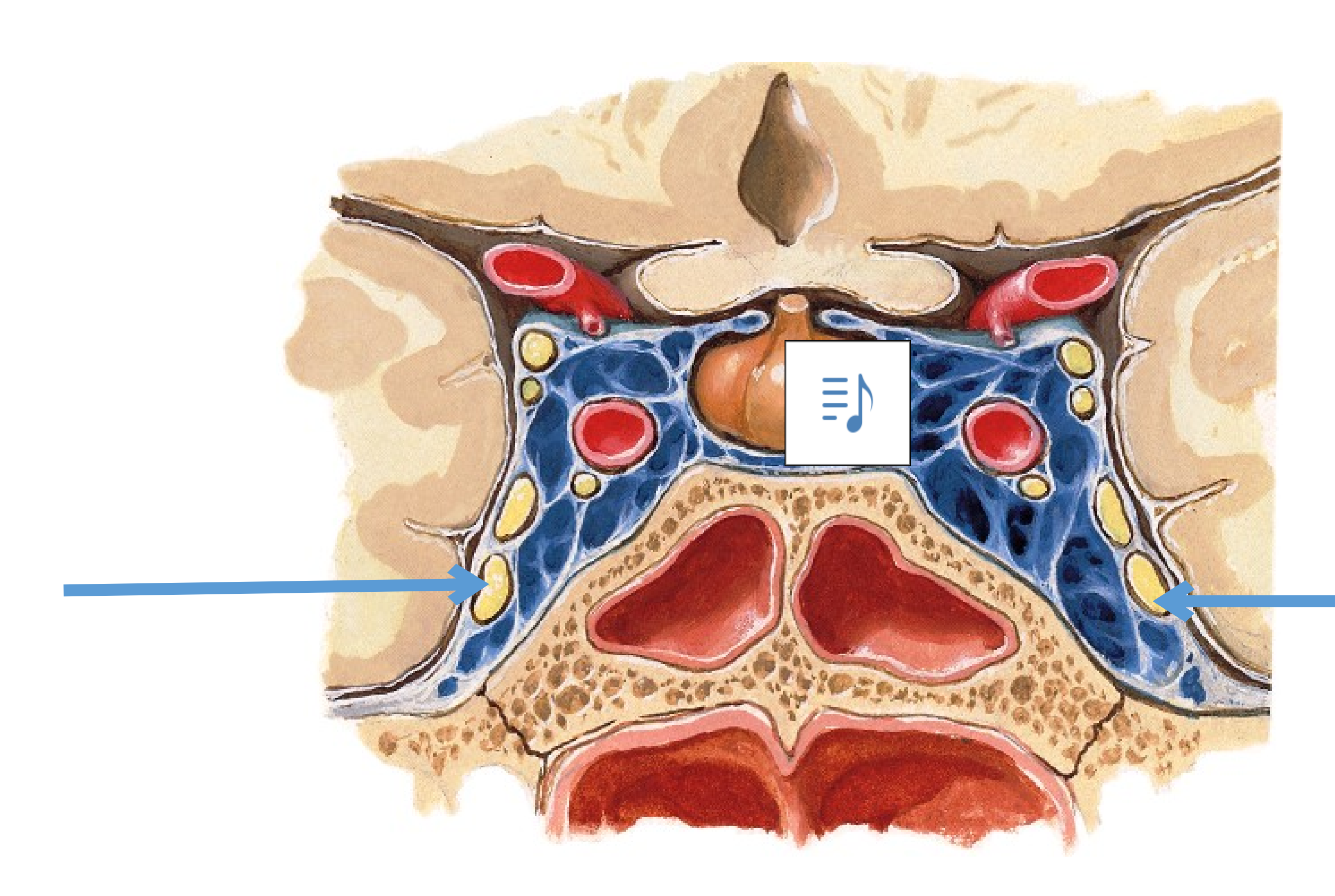
- Passes in lateral wall of cavernous sinus
- Passes in foramen rotundum to enter pterygopalatine fossa
- It hangs pterygopalatine ga[illegible]a
- leaves fossa via infra orbita[illegible]sure then it passes in infraorbital groove then infraorbital canal and then **infraorbital foramen**
- It ends as infra orbital nerve



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Maxillary nerve





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Branches of maxillary nerve



Cranial cavity :

- Meningeal

In pterygopalatine fossa

- Ganglionic
- Zygomatic which gives zygomatic **temporal and zygomatic facial**
- Posterior superior alveolar to molars& maxillary air sinus

In infraorbital groove

- Middle superior alveolar to premolars
- Anterior superior alveolar to incisive and canine

Infra orbital : gives

1. palpebral to **lower eye lid**
2. Nasal: to side of nose
3. Labial to **upper lip**

meningeal

zygomatic

infraorbital

Ganglionic

middle

Posterior sup alveolar

Anterior superior alveolar

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Branches of maxillary nerve



- Pain from upper lip is carried by which of the following nerve

A- Buccal

B- Mental

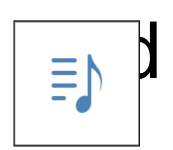
C- Zygomaticofacial

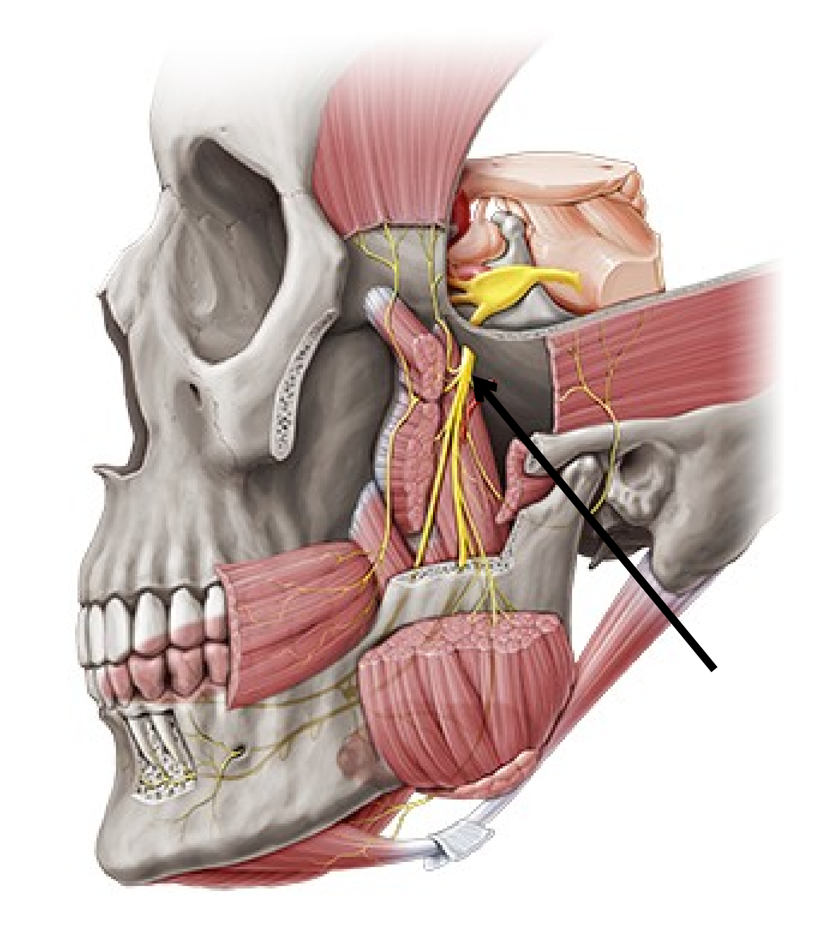
D -Zygomaticotemporal

E- Infraorbital

Mandibular nerve



- Largest branch of trigeminal
- Mixed nerve it has sensory& motc
- Both pass in foramen ovale
- Unite to form trunk
- Trunk divides into anterior  d posterior divisions



Mandibular nerve



Foramen ovale

Trunk

Nervus spinosus

N. to medial pterygoid *

Posterior division (mainly sensory)

- Auriculotemporal N.
- Inferior alveolar N. – Mental N. – Incisive N.
- Lingual N.
- * N. to mylohyiod+ ABD

Anterior division (mainly motor)

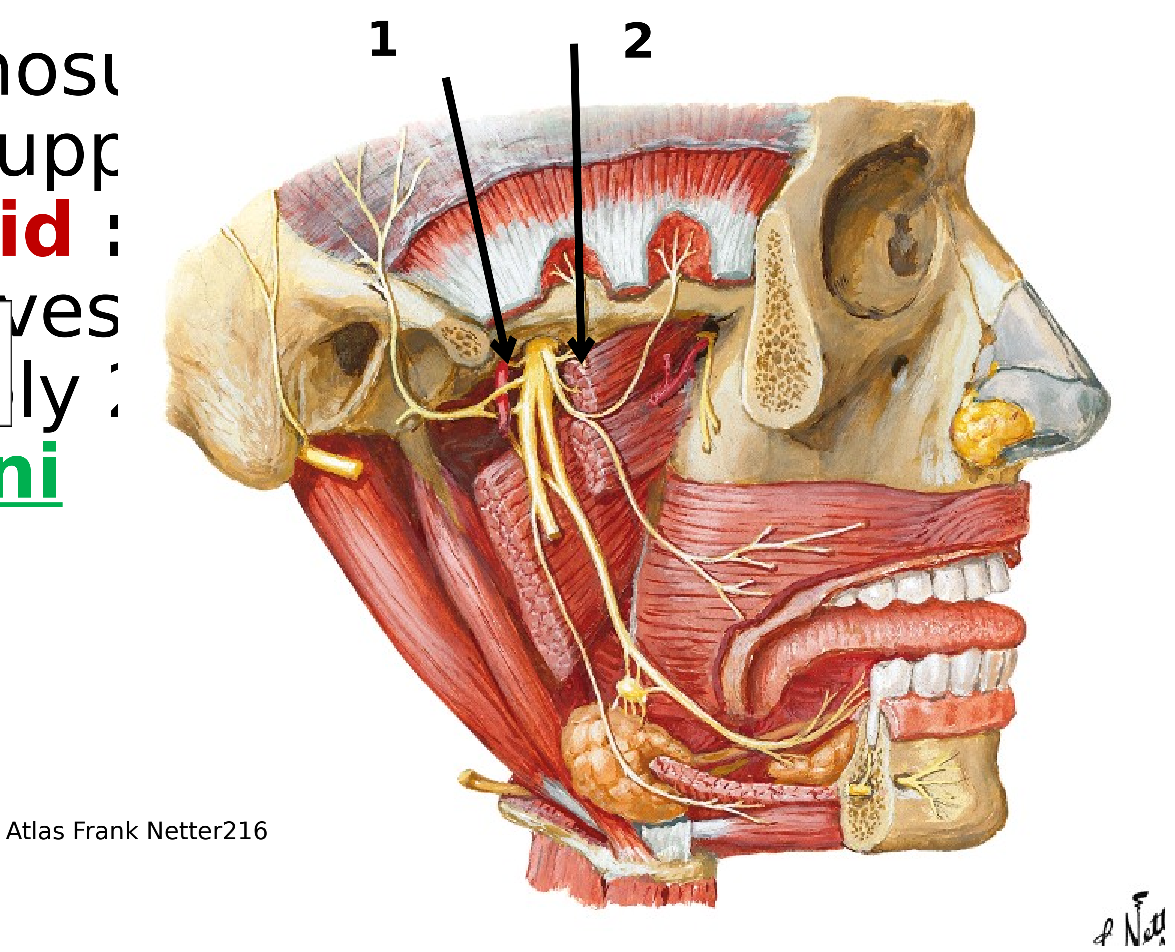
- N. to temporalis *
- N. to lateral pterygoid *
- N. to masster *
- Buccal nerve

Branches of trunk



- **1-Meningeal :**or nervous spinosu
passes in foramen spinosum to supp
- **2- Nerve to medial pterygoid :**
Supplies medial pterygoid and gives
otic ganglia without relay to supply 2
tensor palati & tensor tympani

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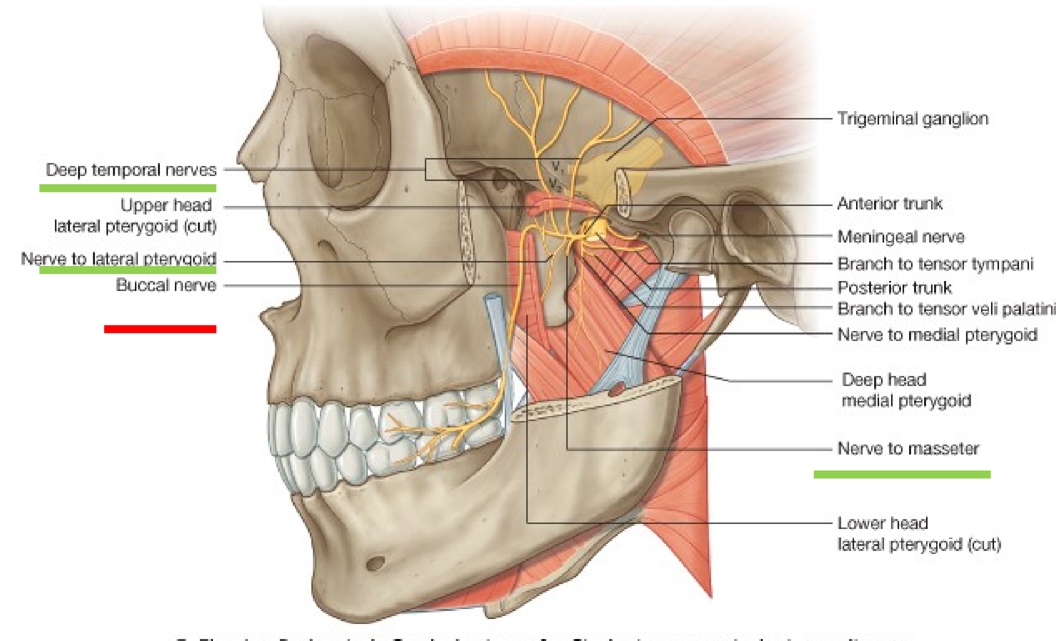
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Branches of anterior division



- **<u>Deep temporal</u> : appear at upper border of lateral pterygoid supply temporalis**
- **<u>Masseteric</u> : appear at upper border of lateral pterygoid supply masseter**
- **<u>Nerve to lateral pterygoid</u>**
- **Buccal :**

only sensory branch of anterior division passes between 2 heads of lateral pterygoid pierce buccinator to supply skin and mucus membrane over cheek



Branches of anterior division



Temporal nerve

Nerve to lateral pteygoid

Buccal nerve

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Branches of posterior division



Auriculo temporal

Inferior alveolar

lingual

Buccal

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Auriculotemporal nerve



- Arise by 2 roots passes backwards around middle meningeal artery
- Backwards between neck of mandible& sphenmandibular ligament
- Upwards deep to parotid
- It appears at upper endof parotid

Supplies:

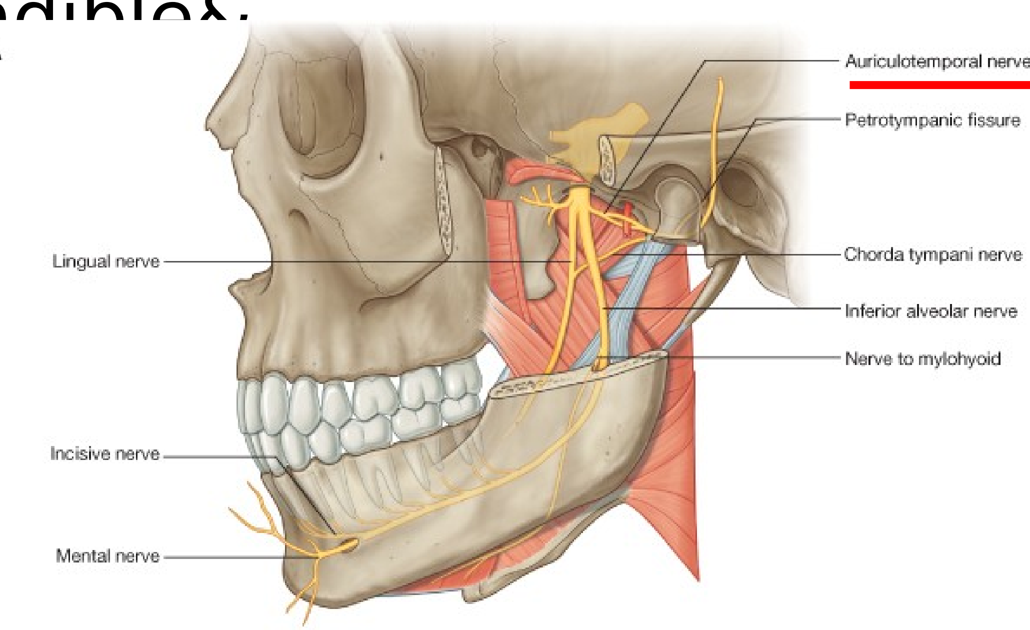
1. Auricle , external auditory meatu outer surface of tympanic membran

2. **Tempromandibular joint**

3. Sensory to **Parotid gland**

4. Carries **parasympathetic** fibers to parotid gland

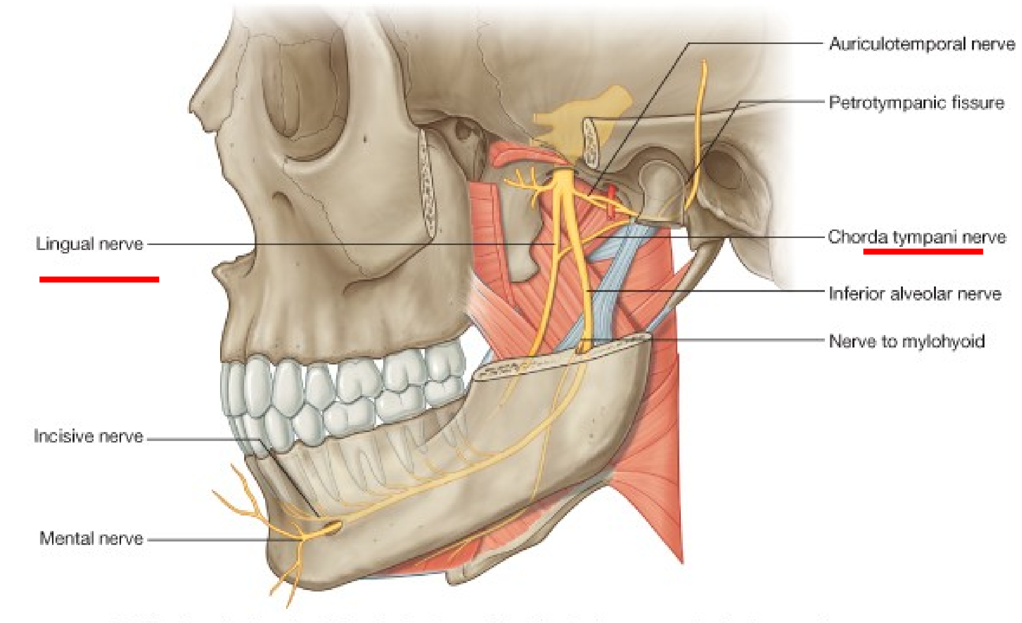
5. Skin of **temporal region**



Lingual nerve

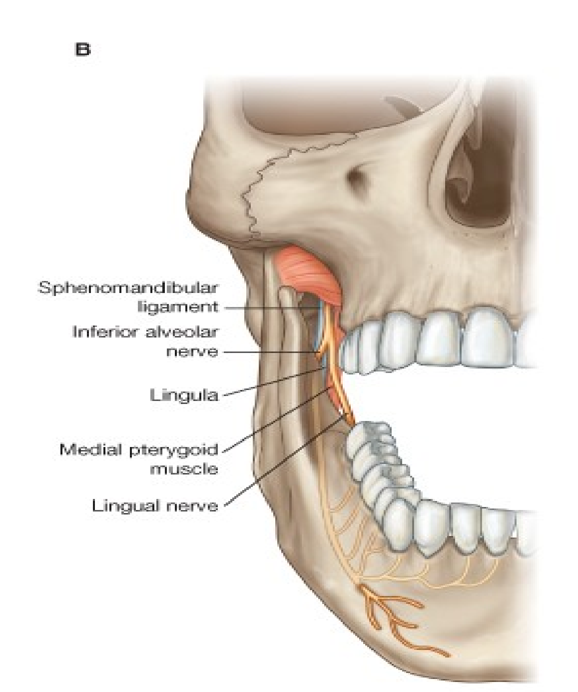


- It arise deep to lateral pterygoid where it is joined by chorda tympani
- It appears at lower border of lateral pterygoid
- Passes between medial pterygoid & ramus
- Passes at medial side of last m being only covered by mucus membrane it is liable to injury
- Crosses hyoglossus where it hangs submandibular ganglia
- Crosses submandibular duct from lateral to medial
- Passes on genioglossus medial to sublingual salivary gland



Lingual nerve





Chorda tympani

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Duct

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Lingual nerve



- Supplies **general sensation** of anterior two thirds of tongue

Floor of mouth & lingual aspect of gingiva

- Carries **preganglionic parasympathetic** to submandibular & sublingual salivary glands
- Carries **post ganglionic parasympathetic** fibers to sublingual salivary gland
- Ganglionic branches

Inferior alveolar nerve



- The only mixed branch
- It appears at lower border of lateral pterygoid posterior to lingual nerve
- Passes between medial pterygoid and r
- Enters mandibular foramen& canal & ex

mental foramen

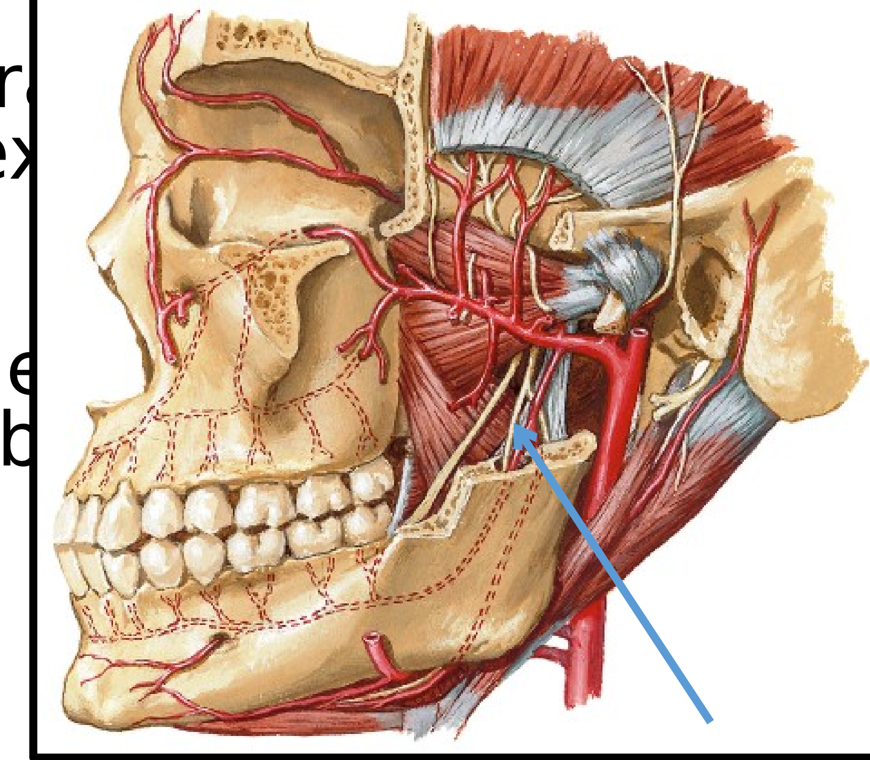
Branches:

1.Mylohyoid branch : arises before nerve e foramen to supply mylohyoid & anterior b diagastric(only motor branch)

2.Mental branch: to chin

3.Incisive branch : lower incisors& canine

4.Sensory to lower teeth &



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Inferior alveolar

Inferior alveolar nerve



1.Mylohyoid branch : arises before nerve enters mandibular foramen to supply mylohyoid & anterior belly of diagastric(only motor branch)
2.Mental branch: to chin
3.Incisive branch : lower incisors& canine
4.Sensory to lower teeth &

Location of trigeminal ganglion
Mandibular nerve
Auriculotemporal nerve
Lingual nerve
Inferior alveolar nerve
Mylohyoid nerve
Inferior alveolar nerve
Incisive nerve
Mental nerve

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Lecture Quiz



Question 1:
Which trigeminal nucleus receives touch sensation ?

a) Main sensory
b) Spinal
c) Mesencephalic
d) Motor nucleus



Question 2
Which branch of maxillary nerve lies in pterygopalatine fossa?

e) Meningeal
f) Zygomatic
g) Middle superior alveolar
h) Infraorbital

Question 3: Pain from upper teeth is carried by which nerves ?

Question 4 : enumerate motor branches of mandibular nerve

SUGGESTED TEXTBOOKS



1. Clinical anatomy by regions by Richard Snell 9th edition

